What is claimed is;

1. An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated emission emitted from the stimulable phosphor sheet upon exposure to the stimulating light, and detecting electric charges generated in the photoconductive material layer upon exposure to the stimulated emission by applying an electric field to the photoconductive material layer, wherein the improvement comprises that

said stimulable phosphor sheet has a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm,

said solid image sensor has a photoconductive material layer whose major component is a-Se, and

said electric field is such as to generate an avalanche amplification effect in the photoconductive material layer.

2. An image read-out method as defined in Claim 1 in which said photoconductive material layer of the solid image sensor is not smaller than 1μm and not larger than 100μm in thickness.

3. An image read-out method as defined in Claim 2 in which said photoconductive material layer of the solid image sensor is not smaller than 10μm and not larger than 50μm in thickness.

4. An image read-out method as defined in Claim 1 in which fluctuation of the image signal due to fluctuation in the electric field applied to the photoconductive material layer is suppressed.

5. An image read-out system comprising

a stimulating light source which emits stimulating light in a wavelength range of not shorter than 600nm,

a stimulating light scanning means which causes the stimulating light emitted from the stimulating light source to scan a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in a wavelength range of not longer than 500nm in proportion to the stored energy of radiation upon exposure to the stimulating light,

a solid image sensor having a photoconductive material layer the major component of which is a-Se and which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet,

an electric voltage imparting means which imparts an electric voltage to the photoconductive material layer of the solid image sensor to apply such an electric field as to generate

an avalanche amplification effect in the photoconductive material layer, and

an image signal obtaining means which detects electric charges generated in the photoconductive material layer of the solid image sensor when the stimulable phosphor sheet is exposed to the stimulating light and stimulated emission emitted from the stimulable phosphor sheet impinges upon the photoconductive material with an electric voltage imparted to the photoconductive material layer by the electric voltage application means to apply such an electric field as to generate an avalanche amplification effect in the photoconductive material layer, and detects an image signal representing an image stored on the stimulable phosphor sheet.

6. An image read-out system as defined in Claim 5 in which said photoconductive material layer of the solid image sensor is not smaller than 1μm and not larger than 100μm in thickness.

7. An image read-out system as defined in Claim 6 in which said photoconductive material layer of the solid image sensor is not smaller than 10μm and not larger than 50μm in thickness.

8. An image read-out system as defined in Claim 5 further comprising a fluctuation suppressing means which suppresses fluctuation of the image signal due to fluctuation in the electric field applied to the photoconductive material layer.

9. An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer of stimulable phosphor which emits

stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet and a pair of electrode layers which are disposed on opposite sides of the photoconductive material layer and are provided with electrodes for detecting electric charges generated in the photoconductive material layer, and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated emission emitted from the stimulable phosphor sheet upon exposure to the stimulating light, and detecting electric charges generated in the photoconductive material layer upon exposure to the stimulated emission by applying an electric field to the photoconductive material layer, wherein the improvement comprises that

said stimulable phosphor sheet has a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm,

said solid image sensor has a photoconductive material layer whose major component is a-Se, and

the electrode of at least one of the electrode layers is divided by picture element pitches into a stripe electrode comprising a plurality of line electrode elements arranged in

a row.

10. An image read-out method as defined in Claim 9 in which the stimulating light is in the form of a line beam which intersects the longitudinal direction of the line electrode elements of said one electrode layer, the line beam is caused to scan the solid image sensor in the longitudinal direction of the line electrode elements of said one electrode layer while applying an electric field between each of the line electrode elements of said one electrode layer and the electrode of the other electrode layer, and electric charges generated in the photoconductive material layer as the line beam scans the solid image sensor are detected line electrode element by line electrode element.

11. An image read-out method as defined in Claim 10 in which the electrode of the other electrode layer is divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer, and an electric field is applied between one of the line electrode elements of said the other electrode layer corresponding to the read-out line and the line electrode elements of said one electrode layer.

12. An image read-out method as defined in Claim 9 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 0.1μm and not larger than 100μm.

13. An image read-out method as defined in Claim 9 in which said electric field is such as to generate an avalanche amplification effect in the photoconductive material.

14. An image read-out method as defined in Claim 13 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 10μm and not larger than 50μm.

15. An image read-out method as defined in Claim 13 in which fluctuation of the image signal due to fluctuation in electric field distribution is suppressed.

16. An image read-out method as defined in Claim 9 in which the photoconductive material layer of the solid image sensor also exhibits electric conductivity upon exposure to recording light bearing thereon image information or momentary light emitted from the stimulable phosphor layer upon exposure to the recording light, and charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer is detected, thereby obtaining a preliminary read-out image signal.

17. An image read-out system comprising

a stimulating light scanning means which causes stimulating light to scan a stimulable phosphor sheet having a stimulable phosphor layer which emits stimulated emission in proportion to the stored energy of radiation upon exposure to the stimulating light,

a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet and a pair of electrode layers which are disposed on opposite sides of the photoconductive material layer and are provided with electrodes for detecting electric charges generated in the photoconductive material layer,

an electric voltage imparting means which imparts an electric voltage to the photoconductive material layer of the solid image sensor to apply an electric field to the photoconductive material layer, and

an image signal obtaining means which detects electric charges generated in the photoconductive material layer of the solid image sensor when the stimulable phosphor sheet is exposed to the stimulating light and stimulated emission emitted from the stimulable phosphor sheet impinges upon the photoconductive material with an electric voltage imparted to the photoconductive material layer by the electric voltage application means to apply an electric field to the photoconductive material layer, and detects an image signal representing an image stored on the stimulable phosphor sheet, wherein the improvement comprises that

said stimulable phosphor sheet has a stimulable phosphor layer which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm,

said solid image sensor has a photoconductive material layer whose major component is a-Se, and

the electrode of at least one of the electrode layers is divided by picture element pitches into a stripe electrode comprising a plurality of line electrode elements arranged in a row.

18. An image read-out system as defined in Claim 17 in which

the stimulating light scanning means causes the stimulating light in the form of a line beam which intersects the longitudinal direction of the line electrode elements of said one electrode layer to scan the solid image sensor in the longitudinal direction of the line electrode elements of said one electrode layer,

the electric voltage imparting means imparts an electric voltage between the electrode layers so that an electric field is generated in the photoconductive material layer between each of the line electrode elements of said one electrode layer and the electrode of the other electrode layer, and

the image signal obtaining means detects electric charges generated in the photoconductive material layer as the line beam scans the solid image sensor line electrode element by line electrode element.

19. An image read-out system as defined in Claim 18 in which

the electrode of the other electrode layer is divided into

a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer, and

the electric voltage imparting means imparts an electric voltage between the electrode layers so that an electric field is applied to the photoconductive material layer between one of the line electrode elements of said the other electrode layer corresponding to the read-out line and the line electrode elements of said one electrode layer.

20. An image read-out system as defined in Claim 17 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 0.1μm and not larger than 100μm.

21. An image read-out system as defined in Claim 17 in which said electric voltage imparting means imparts an electric voltage which applies an electric field such as to generate an avalanche amplification effect in the photoconductive material layer.

22. An image read-out system as defined in Claim 21 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 10μm and not larger than 50μm.

23. An image read-out system as defined in Claim 21 further comprising a fluctuation suppressing means which suppresses fluctuation of the image signal due to fluctuation in the electric field applied to the photoconductive material

layer.

24. An image read-out system as defined in Claim 17 in which

the photoconductive material layer of the solid image sensor also exhibits electric conductivity upon exposure to recording light bearing thereon image information or momentary light emitted from the stimulable phosphor layer upon exposure to the recording light, and

there is provided a preliminary read-out image signal obtaining means which obtains a preliminary read-out image signal bearing thereon image information by detecting charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer.

25. A solid image sensor comprising a photoconductive material layer which exhibits electric conductivity upon exposure to stimulated emission from a stimulable phosphor sheet and a pair of electrode layers which are disposed on opposite sides of the photoconductive material layer and are provided with electrodes for detecting electric charges generated in the photoconductive material layer, wherein the improvement comprises that

said solid image sensor has a photoconductive material layer whose major component is a-Se, and

the electrode of at least one of the electrode layers is divided by picture element pitches into a stripe electrode

comprising a plurality of line electrode elements arranged in a row.

26. A solid image sensor as defined in Claim 25 in which the electrode of the other electrode layer is divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer.

27. A solid image sensor as defined in Claim 25 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 0.1μm and not larger than 100μm.

28. An image detecting sheet comprising

an image recording portion having a stimulable phosphor layer which emits stimulated emission in proportion to stored energy of radiation upon exposure to stimulating light and an image read-out portion which is opposed to the image recording portion and comprises a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet and a pair of electrode layers which are disposed on opposite sides of the photoconductive material layer and are provided with electrodes for detecting electric charges generated in the photoconductive material layer, wherein the improvement comprises that

said image recording portion has a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm,

said image read-out portion has a photoconductive material layer whose major component is a-Se, and

the electrode of at least one of the electrode layers is divided by picture element pitches into a stripe electrode comprising a plurality of line electrode elements arranged in a row.

29. An image detecting sheet as defined in Claim 28 in which the electrode of the other electrode layer is divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer.

30. An image detecting sheet as defined in Claim 28 in which the thickness of the photoconductive material layer of the solid image sensor is not smaller than 0.1μm and not larger than 100μm.

31. An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated

emission emitted from the stimulable phosphor sheet upon exposure to the stimulating light, and detecting electric charges generated in the photoconductive material layer upon exposure to the stimulated emission by applying an electric field to the photoconductive material layer, wherein the improvement comprises the steps of

using a solid image sensor whose photoconductive material layer also exhibits electric conductivity upon exposure to recording light bearing thereon image information (e.g., the radiation passing through the object) or momentary light emitted from the stimulable phosphor layer upon exposure to the recording light,

projecting the recording light onto the stimulable phosphor sheet while applying an electric field to the photoconductive material layer, and

detecting charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer, thereby obtaining a preliminary read-out image signal bearing thereon image information.

42. An image read-out method as defined in Clam 31 in which

a solid image sensor in which a pair of electrode layers are provided on opposite sides of the photoconductive material layer and the electrode of one of the electrode layers is divided into a stripe electrode comprising a plurality of line electrode

elements arranged in a row be used, and

electric charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer are detected by line electrode elements of said one electrode layer.

33. An image read-out method as defined in Claim 32 in which a solid image sensor in which the electrode of the other electrode layer is also divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer is used, and

electric charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer is detected also by line electrode elements of said the other electrode layer.

34. An image read-out system comprising

a stimulating light source which emits stimulating light,

a stimulating light scanning means which causes the stimulating light emitted from the stimulating light source to scan a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to the stimulating light,

a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the

stimulated emission from the stimulable phosphor sheet,

an electric voltage imparting means which imparts an electric voltage to the photoconductive material layer of the solid image sensor to apply an electric field to the photoconductive material layer, and

an image signal obtaining means which detects electric charges generated in the photoconductive material layer of the solid image sensor when the stimulable phosphor sheet is exposed to the stimulating light and stimulated emission emitted from the stimulable phosphor sheet impinges upon the photoconductive material with an electric field applied to the photoconductive material layer, and detects an image signal representing an image stored on the stimulable phosphor sheet, wherein the improvement comprises that

the photoconductive material layer of the solid image sensor also exhibits electric conductivity upon exposure to recording light bearing thereon image information or momentary light emitted from the stimulable phosphor layer upon exposure to the recording light, and

there is provided a preliminary read-out image signal obtaining means which obtains a preliminary read-out image signal bearing thereon image information by detecting charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer.

35. An image read-out system as defined in Claim 34 in

which

the solid image sensor is provided with a pair of electrode layers on opposite sides of the photoconductive material layer, each having an electrode,

the electrode of one of the electrode layers is divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, and

the preliminary read-out image signal obtaining means detects electric charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer by line electrode elements of said one electrode layer.

36. An image read-out system as defined Claim 35 in which

the electrode of the other electrode layer is also divided into a stripe electrode comprising a plurality of line electrode elements arranged in a row, each extending to intersect the line electrode elements of said one electrode layer, and

the preliminary read-out image signal obtaining means detects electric charges generated in the photoconductive material layer when the recording light or the momentary light impinges upon the photoconductive material layer be detected also by line electrode elements of said the other electrode layer.

37. An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer of stimulable phosphor which emits

stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet, and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated emission emitted from the stimulable phosphor sheet upon exposure to the stimulating light, and detecting electric charges generated in the photoconductive material layer upon exposure to the stimulated emission, wherein the improvement comprises that

the solid image sensor has a photoconductive material layer having an area smaller than the area of the stimulable phosphor sheet and the stimulated emission receiving face of the solid image sensor is divided into a plurality of photoelectric conversion segments, and

a plurality of image signal obtaining means are discretely connected to the respective photoelectric conversion segments to detect electric charges generated in the photoelectric conversion segments.

38. An image read-out method as defined in Claim 37 in which an image signal for one picture element is obtained by adding a plurality of image signals obtained from a plurality of image signal obtaining means connected to a plurality of

photoelectric conversion segments which receive stimulated emission from the picture element.

39. An image read-out method as defined in Claim 38 in which the image signals from the image signal obtaining means which are to be added are switched in response to scanning of the stimulating light.

40. An image read-out method as defined in Claim 37 in which a stimulable phosphor sheet having a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm is used, and a solid image sensor having a photoconductive material layer whose major component is a-Se is used.

41. An image read-out method of obtaining an image signal bearing thereon image information by use of a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to stimulating light and a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet, and by scanning with stimulating light a stimulable phosphor sheet which has been exposed to radiation and has stored thereon an image, causing the photoconductive material layer to be exposed to stimulated emission emitted from the stimulable phosphor sheet upon exposure to the stimulating light, and detecting electric

charges generated in the photoconductive material layer upon exposure to the stimulated emission by applying an electric field to the photoconductive material layer, wherein the improvement comprises that

a solid image sensor whose photoconductive material layer has an area smaller than the area of the stimulable phosphor sheet and whose stimulated emission receiving face is divided into a plurality of photoelectric conversion segments is used, and

the photoelectric conversion segments are made active or inactive independently of each other.

42. An image read-out method as defined in Claim 41 in which the photoelectric conversion segments are made active or inactive by controlling application of the electric field to the photoconductive material layer.

43. An image read-out method as defined in Claim 41 in which making active or inactive the photoelectric conversion segment is controlled in response to scanning of the stimulating light.

44. An image read-out method as defined in Claim 41 in which an image signal for one picture element is obtained by adding a plurality of output signals from a plurality of photoelectric conversion segments which receive stimulated emission from the picture element.

45. An image read-out method as defined in Claim 44 in which the output signals from the photoelectric conversion

segments which are to be added are switched in response to scanning of the stimulating light.

46. An image read-out method as defined in Claim 41 in which a stimulable phosphor sheet having a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm is used, and a solid image sensor having a photoconductive material layer whose major component is a-Se is used.

47. An image read-out system comprising

a stimulating light source which emits stimulating light,

a stimulating light scanning means which causes the stimulating light emitted from the stimulating light source to scan a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to the stimulating light,

a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet, and

an image signal obtaining means which detects electric charges generated in the photoconductive material layer of the solid image sensor when the stimulable phosphor sheet is exposed to the stimulating light and stimulated emission emitted from the stimulable phosphor sheet impinges upon the photoconductive material, and obtains an image signal representing an image

stored on the stimulable phosphor sheet, wherein the improvement comprises that

the solid image sensor has a photoconductive material layer having an area smaller than the area of the stimulable phosphor sheet and the stimulated emission receiving face of the solid image sensor is divided into a plurality of photoelectric conversion segments, and

a plurality of image signal obtaining means are discretely connected to the respective photoelectric conversion segments.

48. An image read-out system as defined in Claim 47 further comprising an adder means which obtains an image signal for one picture element by adding a plurality of image signals obtained from a plurality of image signal obtaining means connected to a plurality of photoelectric conversion segments which receive stimulated emission from the picture element.

49. An image read-out system as defined in Claim 48 further comprising a switching means which switches the image signals from the image signal obtaining means which are to be added in response to scanning of the stimulating light.

50. An image read-out system as defined in Claim 47 in which the stimulable phosphor sheet has a layer of stimulable phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm, and the solid image sensor has a photoconductive material layer

whose major component is a-Se.

51. An image read-out system comprising

a stimulating light source which emits stimulating light,

a stimulating light scanning means which causes the stimulating light emitted from the stimulating light source to scan a stimulable phosphor sheet having a layer of stimulable phosphor which emits stimulated emission in proportion to the stored energy of radiation upon exposure to the stimulating light,

a solid image sensor having a photoconductive material layer which exhibits electric conductivity upon exposure to the stimulated emission from the stimulable phosphor sheet,

an electric voltage imparting means which imparts an electric voltage to the photoconductive material layer of the solid image sensor to apply an electric field to the photoconductive material layer and

an image signal obtaining means which detects electric charges generated in the photoconductive material layer of the solid image sensor when the stimulable phosphor sheet is exposed to the stimulating light and stimulated emission emitted from the stimulable phosphor sheet impinges upon the photoconductive material with an electric applied to the photoconductive material layer, and obtains an image signal representing an image stored on the stimulable phosphor sheet, wherein the improvement comprises that

the solid image sensor has a photoconductive material

layer having an area smaller than the area of the stimulable phosphor sheet and the stimulated emission receiving face of the solid image sensor is divided into a plurality of photoelectric conversion segments, and

there is provided a control means which makes active or inactive the photoelectric conversion segments independently of each other.

52. An image read-out system as defined in Claim 51 in which the control means makes active or inactive the photoelectric conversion segments by controlling application of the electric field to the photoconductive material layer.

53. An image read-out system as defined in Claim 51 in which the control means makes active or inactive the photoelectric conversion segments in response to scanning of the stimulating light.

54. An image read-out system as defined in Claim 51 further comprising an adder means which obtains an image signal for one picture element by adding a plurality of output signals from a plurality of photoelectric conversion segments which receive stimulated emission from the picture element.

55. An image read-out system as defined in Claim 54 further comprising a switching means which switches the output signals from the photoelectric conversion segments which are to be added in response to scanning of the stimulating light.

56. An image read-out system as defined in Claim 51 in which the stimulable phosphor sheet has a layer of stimulable

phosphor which is stimulated by stimulating light in a wavelength range of not shorter than 600nm and emits stimulated emission in a wavelength range of not longer than 500nm, and the solid image sensor has a photoconductive material layer whose major component is a-Se.

57. A solid image sensor comprising a photoconductive material layer which exhibits electric conductivity upon exposure to stimulated emission emitted from a stimulable phosphor sheet upon exposure to stimulating light, wherein the improvement comprises that

the photoconductive material layer has an area smaller than the area of the stimulable phosphor sheet and the stimulated emission receiving face of the solid image sensor is divided into a plurality of photoelectric conversion segments.

58. A solid image sensor as defined in Claim 57 in which the major component of the photoconductive material layer is a-Se.